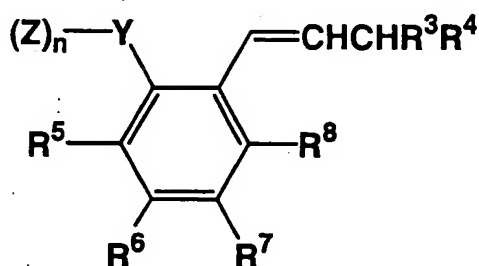


CLAIM

- 1 1. A method of preparing ruthenium or osmium complexes with chelating carbene ligands
2 comprising contacting a ruthenium or osmium carbene complex of the formula
3 $X^1X^2L^1L^2M=CR^1R^2$ with an internal olefin ligand precursor of the formula:



4 wherein

5 X^1 and X^2 are each, independently, any anionic ligand;

6 L^1 and L^2 are each, independently, any neutral electron donor;

7 M is ruthenium or osmium;

8 R^1 and R^2 are each, independently, selected from hydrogen or a substituent selected from the
9 group consisting of alkyl, alkenyl, alkynyl, aryl, alkylcarboxylate, arylcarboxylate, alkoxy, alkenyloxy,
10 alkynyloxy, aryloxy, alkoxycarbonyl, alkylthio, alkylsulfonyl, alkylsulfinyl, and trialkylsilyl, wherein
11 each of the substituents is substituted or unsubstituted;

12 R^3 and R^4 are each, independently, selected from hydrogen or a substituent selected from the
13 group consisting of alkyl, aryl, alkoxy, aryloxy, C_2 - C_{20} alkoxycarbonyl, and C_1 - C_{20} trialkylsilyl, wherein
14 each of the substituents is substituted or unsubstituted;

15 R^5 , R^6 , R^7 , and R^8 are each, independently, selected from the group consisting of hydrogen,
16 halogen, alkyl, alkenyl, alkynyl, aryl, heteroaryl, alkoxy, alkenyloxy, aryloxy, alkoxycarbonyl, carbonyl,
17 alkylamino, alkylthio, alkylsulfonyl, nitrile, nitro, alkylsulfinyl, trihaloalkyl, perfluoroalkyl, carboxylic
18 acid, ketone, aldehyde, nitrate, cyano, isocyanate, hydroxyl, ester, ether, amine, imine, amide, sulfide,
19 disulfide, sulfonate, carbamate, silane, siloxane, phosphine, phosphate, or borate;

20 Y is a heteroatom selected from the group oxygen (O), sulfur (S), nitrogen (N), or phosphorus
21 (P);

22 n is 1, in the case of a divalent heteroatom such as O or S, or 2, in the case of a trivalent
23 heteroatom such as N or P; and

24 Z is a group selected from hydrogen, alkyl, aryl, functionalized alkyl, functionalized aryl where
25 the functional group(s) may independantly be one or more of the following: alkoxy, aryloxy, halogen,
26 carboxylic acid, ketone, aldehyde, nitrate, cyano, isocyanate, hydroxyl, ester, ether, amine, imine, amide,
27 sulfide, disulfide, carbamate, silane, siloxane, phosphine, phosphate, or borate.